



Do you use and recharge Optima (lead-acid) batteries?

Would you like to improve this process in the following areas?

- **Meet environmental compliance regulations.** Reduce the volume of Optima (lead-acid) batteries disposed of as hazardous waste due to improper charging.
- **Improve workers' safety and health.** Reduce personnel exposure to hazardous chemicals through proper battery charging.
- **Increase productivity.** Reduce equipment down-time while increasing the functional reliability of the Optima battery and starting system.
- **Save money.** Reduce Optima battery procurement costs, battery replacement labor hours, and the costs associated with battery disposal due to improper charging.



Optima Battery and Charger

The Optima battery is regarded as lead-acid battery (not a Gel type) and is based on SPIRALCELL technology (Absorbed Glass Mat). The SPIRALCELL design provides for closer plate spacing, plate surface area, and superior vibration resistance. Information on maintenance/charger systems for these batteries was previously provided in EQI Fact Sheet number 2-19. The Navy Field Activity Support and Technology Transfer (FASTT) Team discovered that Optima batteries were being "cooked", or damaged, during the recharging process. The manufacturer revealed that recharging Optima batteries must be performed properly with voltage limited to a range of 14.2 to 15 volts, with the amperage tapering down during recharging (i.e. **not constant current**). The manufacturer recommends that chargers should have automatic shut off capability and the means to remove sulfation from battery plates. Also, the user must allow the battery to be fully charged. Usually when the current tapers down to about 1 amp, the battery is about 90% charged and the remaining 10% may take a couple of hours or more. **Battery maintenance/charger systems are available as off-the-shelf items from a variety of suppliers.**

How can you achieve these improvements?

Use a proper battery maintenance/charger system for Optima batteries.

How does this system work?

Proper battery maintenance/charger systems eliminate overcharging and sulfation buildup on battery plates, which are the principal causes of Optima battery failure.

How will this system save you money?

Battery maintenance/charger systems can extend battery service life, reduce procurement and disposal costs, and reduce maintenance labor hours. Equipment costs for a typical 20 amp system are \$695.



Typical Process Flow Diagram



How can this technology eliminate or reduce pollution?

This P2 technology can extend battery life and reduce hazardous waste generation. Implementation will result in the following pollution reductions:

- Reduce the number of spent Optima batteries.

Which shops can benefit most from this technology?

This technology can be used by Navy shops and organizations that use lead-acid batteries in their equipment and vehicles. Typical shops and applications include:

- Public Works Department
- Motor Pool
- Construction Equipment Department
- Aircraft Intermediate Maintenance Depot
- Crash-Fire-Rescue Unit
- Shore Intermediate Maintenance Activity
- Fire and Safety Department
- Morale, Welfare and Recreation
- Security Department
- Supply Department

How can this technology reduce regulatory compliance concerns?

This P2 technology can extend the service life of Optima lead-acid batteries. Implementation will result in the following regulatory compliance benefits:

- Reduction in waste batteries helps facilities meet the requirement of waste minimization under RCRA, 40 CFR 262.41 (a)(6).
- Helps facilities reduce the quantity of waste batteries and the associated waste that must be managed to comply under RCRA, 40 CFR 262 (i.e., recordkeeping, reporting, inspections, transportation, accumulation time, and emergency response measures).



Achieving Environmental Compliance Through Pollution Prevention

Every day the Navy faces the challenge of operating and maintaining the fleet while complying with environmental regulations. This burden can be reduced by using pollution prevention technologies and methods to reduce compliance requirements. This fact sheet is one in a series designed to encourage activities to use pollution prevention technologies and methods. The overall goal of this series is to promote sustained environmental compliance at the lowest life-cycle cost.

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